

### AMENDMENTS TO THE CLAIMS

1. **(Currently Amended)** A method for directing a population of embryonic stem cells to differentiate ~~along a~~ to mesodermal cell lineage tissue, said method comprising:  
culturing said embryonic stem cells in the presence of a medium in which said cells will partially differentiate into early primitive ectoderm-like (EPL) cells;  
culturing said EPL cells in suspension culture, thereby forming EPL embryoid bodies (EB);  
culturing the EB in the presence of bone morphogenetic protein 4 (BMP4) or a homologue, analogue or functional equivalent thereof for a time and under conditions sufficient for said cells within the EB to preferentially differentiate into said mesodermal cells or cells of a mesodermal lineage tissue.
2. **(Currently Amended)** The method of claim 36 1, wherein said cells are EPL cells.
3. **(Cancelled)**
4. **(Currently Amended)** The method of claim 36 3, wherein said ~~stem~~ cells of mesodermal lineage are selected from the group consisting of ~~embryonic stem cells~~, somatic stem cells, germ stem cells, epidermal stem cells, adult neural stem cells, keratinocyte stem cells, melanocyte stem cells, adult renal stem cells, embryonic renal epithelial stem cells, embryonic endodermal stem cells, hepatocyte stem cells, mammary epithelial stem cells, ~~bone~~ bone marrow-derived stem cells, skeletal muscle stem cells, bone marrow mesenchymal stem cells, CD34<sup>+</sup> haematopoietic stem cells and mesenchymal stem cells.
5. **(Original)** The method of either claim 1 or claim 36, wherein said BMP4 is derived from a homologous species to said cells.
6. **(Original)** The method of either claim 1 or claim 36, wherein said BMP4 is derived from a heterologous species to said cells.
7. **(Original)** The method of either claim 1 or claim 36, wherein said cells are isolated from an animal selected from the group consisting of primates, livestock animals, laboratory test animals, companion animals and avian species.
8. **(Original)** The method of claim 7, wherein said cells are isolated from a mammal.

9. **(Original)** The method of claim 8, wherein said cells are isolated from a human.

10. **(Currently Amended)** A method for generating mesodermal cells from embryonic stem (ES) or EPL cells said method comprising:

(a) culturing embryonic stem (ES) or early primitive ectoderm-like (EPL) cells in MEDII or its functional equivalent in order to generate embryoid bodies (EBM);

(b) maintaining said EBMs in culture for a time sufficient to allow aggregation of said EBMs;

(c) transferring said aggregated EBMs to gelatin-treated wells;

(d) allowing said aggregated EBMs to adhere to said gelatin-treated wells; and

(e) culturing said adhered EBMs in serum free medium comprising BMP4 for a time sufficient to allow said EBMs to generate mesodermal cells, and thereby generating mesodermal cells from ES cells or EPL cells.

11. **(Original)** The method of claim 10, wherein said BMP4 is derived from a species homologous to said cells.

12. **(Original)** The method of claim 10, wherein said BMP4 is derived from a species heterologous to said cells.

13. **(Original)** The method of claims 10, wherein said cells are isolated from an animal selected from the group consisting of primates, livestock animals, laboratory test animals, companion animals and avian species.

14. **(Original)** The method of claim 13, wherein said cells are isolated from a mammal.

15. **(Original)** The method of claim 14, wherein said cells are isolated from a human.

16-35. **(Cancelled)**

36. **(New)** A method of directing a population of cells of mesodermal lineage to differentiate into mesodermal tissue, said method comprising:

culturing said cells of mesodermal lineage in the presence of bone morphogenetic protein 4 (BMP4) for a time sufficient for said cells to preferentially differentiate into said mesodermal tissue.

37. **(New)** The method of Claim 1 wherein the medium is MEDII.

Appl. No. : 10/675,938  
Filed : September 30, 2003

38. (New) The method of Claim 37, wherein the mesodermal tissue comprises cardiomyocytes.